

Application No.: 10/521,173
Amendment under 37 CFR 1.116
Reply to Office Action dated October 28, 2008
December 16, 2008

REMARKS

By this amendment, claims 1-2, 5 and 10 have been cancelled, and claims 3 and 8 has been amended in the application. Currently, claims 3-4 and 6-9 are pending in the application.

Claim 5 was objected to because the Examiner believed that the phrase "deice" should be amended to "device". By this amendment, claim 5 has been cancelled, and therefore, this objection is now moot.

Claims 1, 5, 8 and 10 were rejected under 35 USC 103(a) as being obvious over Doring (U.S. Patent No. 6,429,426) in view of Mizushima (JP 2951477). Also, claims 2 and 9 were rejected under 35 USC 103(a) as being obvious over Doring in view of Mizushima, and further in view of Hashimoto et al. (U.S. Patent No. 4,870,284).

These rejections are respectfully traversed in view of the amendments to the claims and the remarks below.

The present invention relates to a charging device of aerosol particles using an X-ray source for generating a soft X-ray (see page 1, lines 5-7 of the specification).

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As shown in Fig. 3, an X-ray emitting section 22 is arranged at an opening at a side of a chamber 21. The X-ray emitting section 22 emits X-rays from the middle of a left end of the cylindrical chamber. An inlet duct 23 for introducing the aerosols is arranged at an upper part of the chamber 21. An outlet duct 24 for exhausting the bipolar charged aerosols is arranged at the middle of the other end of the chamber. A rectifying plate 25 having a plurality of openings for rectification is arranged in the vicinity of the outlet duct 24. (see page 7, lines 13-22 of the specification).

In Fig. 6, a chamber 31 is formed by a cylindrical part 32 and electrodes 33, 34 for the upper surface and the lower surface. A direct current high-voltage power source 35 is connected between the upper and lower electrodes 33, 34, and an ammeter 36 is connected to the electrode 33 of the upper surface. An inlet duct 37 and a outlet duct 38 are arranged on the upper part of the chamber 31 at positions facing each other (see page 10, line 22 - page 11, line 4 of the specification).

By this amendment, independent claim 8 has been amended to include similar claim features to cancelled claim 10. Specifically, independent claim 8 has been amended to recite "a rectifying plate which is arranged closer to said outlet duct

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than said inlet duct in said chamber, said rectifying plate dividing said chamber into a section with said inlet duct and a section with said outlet duct, and having a plurality of openings for rectifying air flow in said chamber". These claimed features are not shown or suggested by Doring, Mizushima, Hashimoto et al. and Takao.

Doring relates to an ionization chamber with a non-radioactive ionization source (see col. 1, lines 5-6).

Doring discloses a chamber with inlet ducts 7 and 8, an outlet duct and a radioactive emission source 10 and an ion admission grid 3.

Doring does not disclose a rectifying plate which is arranged closer to said outlet duct than said inlet duct in said chamber, said rectifying plate dividing said chamber into a section with said inlet duct and a section with said outlet duct, and having a plurality of openings for rectifying air flow in said chamber as claimed in independent claim 8.

Applicants respectfully submit that the ion admission grid 3 of Doring is different from the rectifying plate of the present invention. Specifically, the rectifying plate of the present invention has a plurality of openings to rectify uniform air flow in the chamber. On the other hand, the ion admission grid 3 of

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Doring is used as an electrical ion gate (for example, a Nielsen-Bradbury type gate) (see col. 11, lines 20-21 of Doring).

Therefore, the ion admission grid 3 (electrical ion gate) of Doring is totally different from the rectifying plate of the present invention.

For these reasons, it is believed that Doring does not show or suggest the presently claimed invention. Applicants also submit that Mizushima do not make up for the deficiencies in Doring.

Mizushima relates to an X-ray tube with a Beryllium window. Mizushima discloses that the Beryllium window is used as a window for the X-ray to penetrate the window.

Mizushima does not disclose a rectifying plate which is arranged closer to said outlet duct than said inlet duct in said chamber, said rectifying plate dividing said chamber into a section with said inlet duct and a section with said outlet duct, and having a plurality of openings for rectifying air flow in said chamber as claimed in independent claim 8.

It is therefore respectfully submitted that Doring and Mizushima, individually or in combination, do not teach, disclose or suggest the presently claimed invention and it would not have

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been obvious to one of ordinary skill in the art to combine these references to render the present claims obvious.

Claim 3 was rejected under 35 USC 103(a) as being obvious over Takao et al. (JP 2001-070743) in view of Mizushima. Also, claims 4 and 6-7 were rejected under 35 USC 103(a) as being obvious over Takao et al. in view of Mizushima, and further in view of Hashimoto et al.

These rejections are respectfully traversed in view of the remarks below.

Independent claim 3 recites "an electric field generation section which includes electrode plates arranged on both surfaces facing each other in said chamber and generates an electric field from an irradiating section to a non-irradiating section within said chamber; an X-ray emitting section which is arranged facing said chamber and emits an X-ray to said irradiating section of said chamber having a main wavelength within a range of 0.13 nm to 2 nm". These claimed features are not shown or suggested by Takao et al., Mizushima and Mizuno et al.

Takao et al. relate to a gas separation apparatus.

Takao et al. disclose that air containing impurity gas molecule components is introduced into a cylindrical chamber 11

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through a gas inlet member 16 and the gases are ionized by α ray from a radiation source 17.

Takao et al. do not disclose an electric field generation section which includes electrode plates arranged on both surfaces facing each other in the chamber and generates an electric field from an irradiating section to a non-irradiating section within the chamber; and an X-ray emitting section which is arranged facing the chamber and emits an X-ray to the irradiating section of the chamber having a main wavelength within a range of 0.13 nm to 2 nm as claimed in independent claim 3.

Specifically, in the present invention, there are irradiating and non-irradiating sections in the chamber and the X-ray emitting section emits an X-ray only to the irradiating section in the chamber. Further, the inlet duct and outlet duct are arranged in the non-irradiating section. This configuration helps generate the unipolar charged aerosols.

On the other hand, Takao discloses parallel electric plates, a radioactive source, an inlet duct and two outlet ducts. The radioactive source faces the middle of the chamber and two outlet ducts are arranged in the middle of the electric plates, respectively. The gas separating device of Takao generates

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bipolar charged particles and does not generate unipolar charged particles as claimed in the present invention.

For these reasons, it is believed that Takao et al. do not show or suggest the presently claimed invention. Applicants also submit that Mizushima and Hashimoto et al. do not make up for the deficiencies in Takao et al.

Mizushima and Hashimoto et al. do not disclose an electric field generation section which includes electrode plates arranged on both surfaces facing each other of the chamber and generates an electric field from an irradiating section to a non-irradiating section of an X-ray within the chamber; and an X-ray emitting section which is arranged facing the chamber and emits an X-ray to the irradiating section of the chamber having a main wavelength within a range of 0.13 nm to 2 nm as claimed in independent claim 3.

It is therefore respectfully submitted that Takao et al., Mizushima and Hashimoto et al., individually or in combination, do not teach, disclose or suggest the presently claimed invention and it would not have been obvious to one of ordinary skill in the art to combine these references to render the present claims obvious.

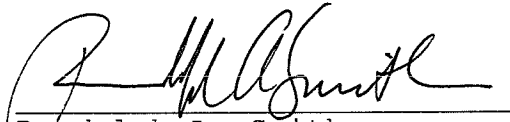
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In view of foregoing claim amendments and remarks, it is respectfully submitted that the application is now in condition for allowance and an action to this effect is respectfully requested.

If there are any questions or concerns regarding the amendments or these remarks, the Examiner is requested to telephone the undersigned at the telephone number listed below.

Respectfully submitted,

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